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The ADL 3D Repository: A Blueprint for Access and Discovery

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Advanced Distributed Learning

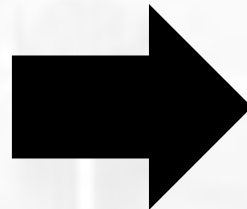
Robert Chadwick

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Advanced Distributed Learning



The Problem



Commercial Platforms



- **Turbosquid**
 - Input: Heterogeneous forms of content (.zip)
 - Output: Zip file containing author-defined content



- **Google 3D warehouse**
 - Input: Homogeneous forms of content (.kmz)
 - Output: COLLADA (.dae) or .skp

OurBricks

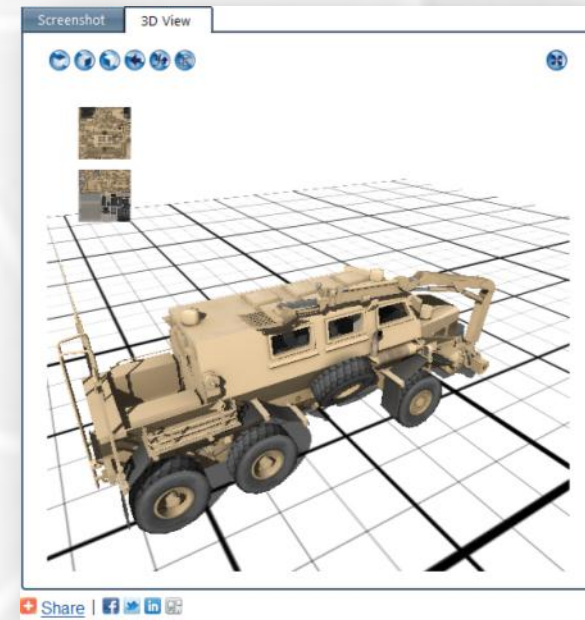
- **OurBricks**
 - Input: COLLADA (.dae), .obj, .fbx, .dxf, .kmz
 - Output: WebGL View or COLLADA (.dae)

Solution Requirements

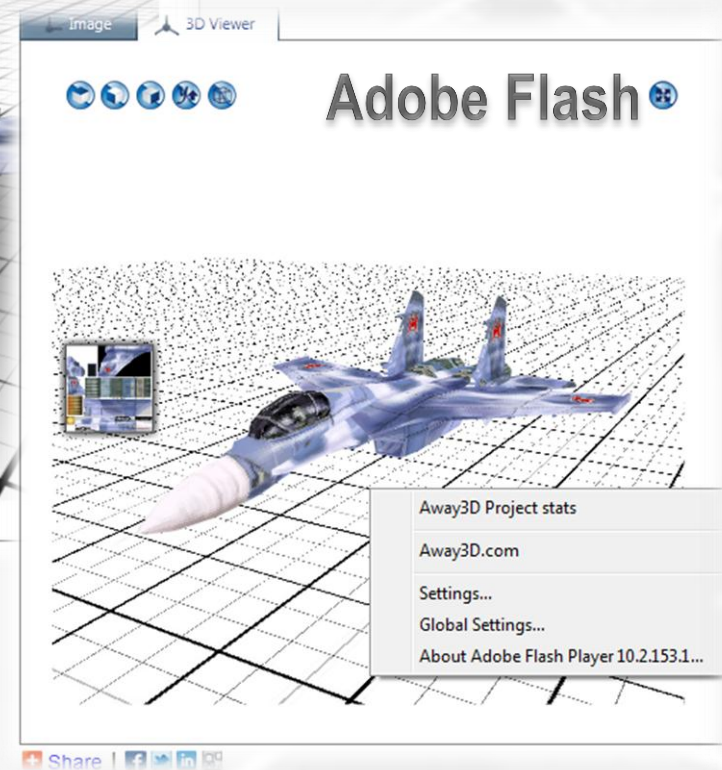
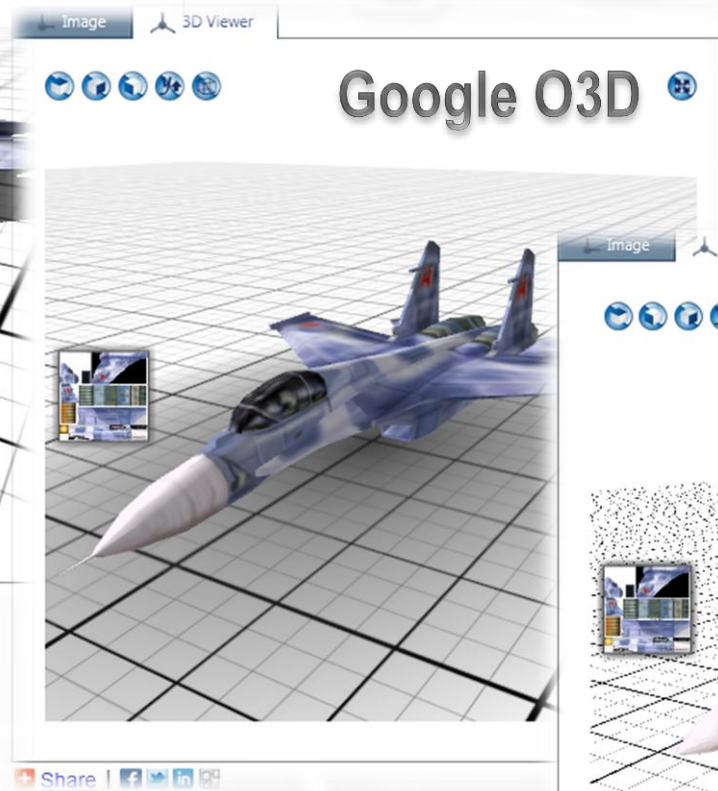
- **Distributed Approach**
- **Easy Access**
- **Open Source**
- **Federated**
- **Usability**
- **Easy upload, search, and download**
- **Value-added services**
 - Automatically generate metadata
 - Web browser 3D previews
 - Conversion services (COLLADA)
- **API**

3DR Features

- **Social media features**
 - Ratings and reviews
- **Upload and download**
- **Upload and download in a variety of formats**
- **Automatic parsing of content for metadata**
- **Real-time previews**
 - Using several technologies for browser support



Real Time 3D Viewers



Model Conversion and Conditioning

- **Conversion to Collada on upload**
- **Models are split up into triangles**
- **Textures are formatted in PNG, scaled to 512x512**
- **Hierarchy is flattened**
- **3D texture coordinates flattened to 2D**
- **Models available for download as FBX, DAE, OBJ, 3DS or JSON**



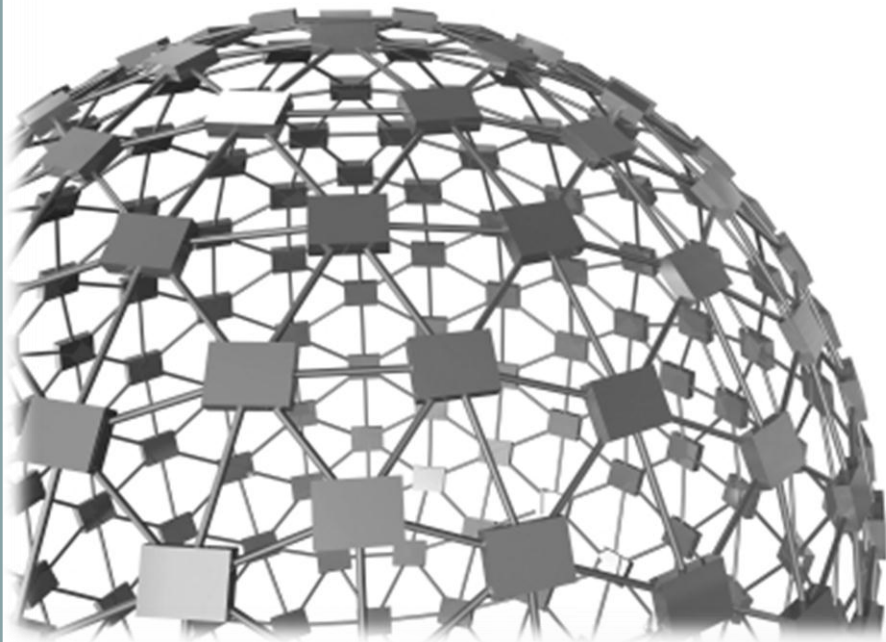
3D Services API

- **Allows machine-to-machine negotiation of content**
 - Search
 - Download
 - Query Metadata
- **Write software that leverages the 3DR**
- **Allows federation**
- **RESTful design**



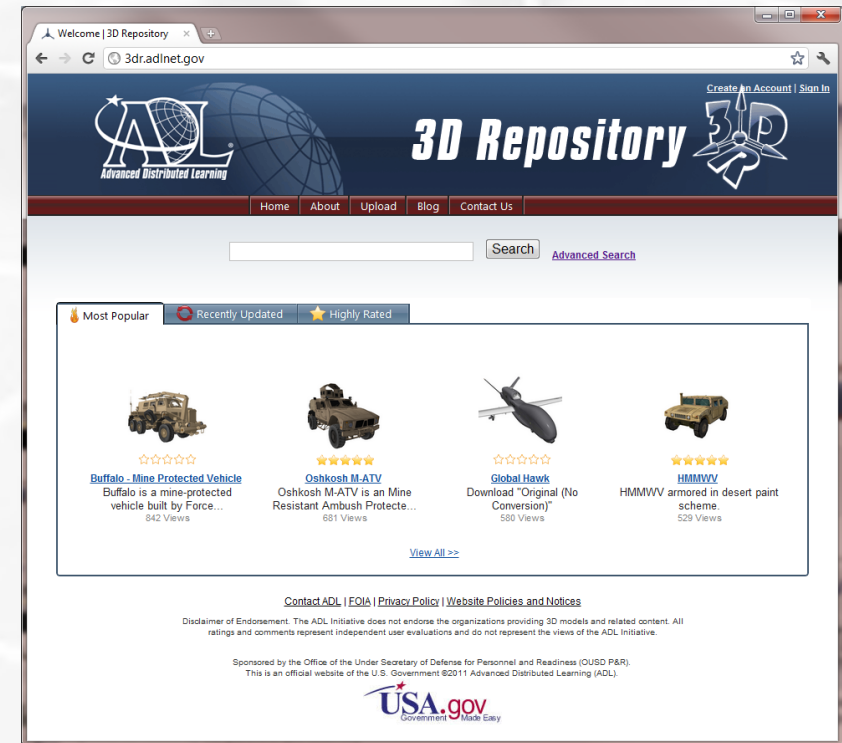
Federation

- **Distributed search**
- **Forwards content requests to federates**
- **Search and share in one place, but host your own data**
- **Allow users to see, but not access content**



Prototype Usage Statistics

- Over 70 countries visited
- 3D models tested: 241
- Registered Users: 273
- Model Views: 23,000+
- Model Downloads: 1,400+



<http://3dr.adlnet.gov>

3D Models Tested



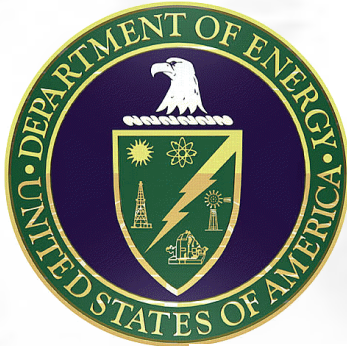
Lessons Learned

Technical Challenges

- **Format support**
 - Variable support in game engines and DCC tools
 - No highly robust open source converters
 - Complexity of content
 - Interchange formats not always available
- **Security**
- **Browser support**
 - WebGL or plugins
 - Web 2.0



Partners



Content Management Challenges

- **Upload vs. File Transfer Protocol (FTP)**
- **Organization of content**
 - Individual 3D objects
- **Systems**
- **Dependencies**



Governance Challenges

- **Contracting**
 - Ensuring rights are obtained
- **Licensing**
 - Some confusion within Government
 - Some concern from Industry
- **Content Formats**
 - Run-time
 - Source
 - Interchange
- **Security**
 - Balancing security and access concerns



Future Role

- **ADL Best Practices Guide**
 - Contracting
 - Licensing
 - Release
- **ADL's new role**
 - R&D vs. sustainment
 - Transition open source software
 - Demand-driven
 - Federation

Future Work

- **Permissions**
 - Fine-grained control over access to models
- **Expanded API**
 - Upload as well as download
- **Additional Format Support**
 - Expand supported file formats
 - Expand supported features for Collada



Questions?

Thank you!

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